

-21-

**CLAIMS:**

1. An improved method for hydrotreating a diesel boiling range feedstream containing both nitrogen and sulfur contaminants comprising:
  - a) providing a sulfuric acid solution having a sulfuric acid concentration of at least about 75 wt.%, based on the sulfuric acid solution;
  - b) contacting a diesel boiling range feedstream containing both nitrogen and sulfur heteroatoms with the sulfuric acid solution under conditions effective at removing at least about 85 wt.% of the nitrogen compounds contained in said diesel boiling range feedstream thereby producing at least a diesel boiling range product and a used sulfuric acid solution, wherein the volumetric treat rate of the sulfuric acid solution is greater than about 0.5 vol.%, based on the diesel boiling range feedstream; and
  - c) hydrotreating said diesel boiling range product.
2. The process according to claim 1 wherein the nitrogen-containing diesel boiling range feedstream boils in the range of about 300°F to about 775°F.
3. The process according to any preceding claim wherein the nitrogen-containing diesel boiling range feedstream boils in the range of about 400°F to about 700°F.
4. The process according to any preceding claim wherein the nitrogen-containing diesel boiling range feedstream contains about 50-1000 wppm nitrogen.

-22-

5. The process according to any preceding claim wherein the nitrogen present in said nitrogen-containing diesel boiling range feedstream includes carbazole and/or substituted carbazoles.
6. The process according to any preceding claim wherein said sulfuric acid solution contains greater than about 75 wt.% sulfuric acid.
7. The process according to any preceding claim wherein said sulfuric acid solution is obtained from an alkylation process unit.
8. The process according to any preceding claim wherein said alkylation process comprises:
  - a) combining an olefinic hydrocarbon feedstream containing C<sub>4</sub> olefins with isobutane to form a hydrocarbonaceous mixture; and
  - b) contacting the hydrocarbonaceous mixture with sulfuric acid under conditions effective for producing at least an alkylate and a sulfuric acid solution having an acid concentration of at least about 75 wt.%.
9. The process according to any preceding claim wherein water is added to said sulfuric acid solution to adjust the sulfuric acid concentration of said sulfuric acid solution.
10. The process according to any preceding claim wherein said diesel boiling range product has less than about 200 wppm nitrogen.

-23-

11. The process according to any preceding claim wherein the sulfur concentration of the diesel boiling range product is about 0.1 to about 25 wt.% less than the diesel boiling range feedstream.
12. The process according to any preceding claim wherein the yield loss attributed to the sulfuric acid solution treatment is about 0.5 to about 6 wt.%.
13. The process according to any preceding claim wherein the treat rate of the sulfuric acid solution is greater than about 0.5 vol.%.
14. The process according to any preceding claim wherein the treat rate of the sulfuric acid solution is about 0.5 to about 20 vol.%
15. The process according to any preceding claim wherein the nitrogen-containing diesel boiling range feedstream and the sulfuric acid solution are intimately contacted by a contacting method selected from non-dispersive and dispersive contacting methods.
16. The process according to any preceding claim wherein the non-dispersive contacting method is selected from packed inert particle beds and fiber film contactors.
17. The process according to any preceding claim wherein the dispersive contacting method is selected from mixing valves, static mixers and mixing tanks or vessels.

-24-

18. The process according to any preceding claim wherein said process further comprises separating said diesel boiling range product and said used sulfuric acid solution.

19. The process according to any preceding claim wherein the diesel boiling range product and the used sulfuric acid solution are separated by any means known to be effective at separating an acid from a hydrocarbon stream.

20. The process according to any preceding claim wherein the diesel boiling range product and the used sulfuric acid solution are separated by a separation device selected from settling tanks or drums, coalescers, electrostatic precipitators, and other similar devices.

21. The process according to any preceding claim wherein the diesel boiling range product and the used sulfuric acid solution are separated by fiber film contactors.

22. The method according to any preceding claim wherein the hydrotreating of the diesel boiling range product is achieved by contacting said diesel boiling range product with a hydrotreating catalysts containing at least one Group VI metal oxide and at least one Group VIII metal oxide under conditions effective at removing or converting at least a portion of the sulfur contained in said diesel boiling range product.

23. The method according to any preceding claim wherein said improved method further comprises contacting said diesel boiling range product with an effective amount of an acid reducing material selected from caustic and water

-25-

under conditions effective at reducing the total acid number of said diesel boiling range product prior to hydrotreating.

24. An improved method for hydrotreating a diesel boiling range feedstream containing both nitrogen and sulfur contaminants comprising:

- a) providing a sulfuric acid solution having a sulfuric acid concentration of greater than about 75 wt.%, based on the sulfuric acid solution;
- b) contacting a diesel boiling range feedstream containing both nitrogen and sulfur contaminants and boiling in the range of about 350°F to about 750°F with the sulfuric acid solution under conditions effective at removing greater than about 85 wt.% of the nitrogen compounds contained in said diesel boiling range feedstream thereby producing at least a diesel boiling range product and a used sulfuric acid solution, wherein the volumetric treat rate of the sulfuric acid solution is greater than about 0.5 vol.%, based on the diesel boiling range feedstream and said contacting is achieved through the use of a non-dispersive method; and
- c) hydrotreating said diesel boiling range product by contacting said diesel boiling range product with a hydrotreating catalysts containing at least one Group VI metal oxide and at least one Group VIII metal oxide under conditions effective at removing or converting at least a portion of the sulfur contained in said diesel boiling range product.